Beach Ball Coronagraph

Completed Technology Project (2013 - 2014)

Project Introduction

A precision formation flying coronagraph with an inflatable, passive 'beach ball' occulter has the chance to make possible the next generation of advances in coronal physics, while wowing scientist and the general public with amazing images and movies of the Sun's evolution on timescales of seconds for solar eruptions to years in studying the coronal evolution over the solar cycle. The limiting component on this system is the inflatable occulter, which has not even begun to be conceptualized.

The "Beach Ball" Coronagraph will be the first steps to simplify and revolutionize the next generation solar coronagraph design. The solar corona is the source region of solar eruptions, both solar flares and coronal mass ejections (CMEs). These eruptions are initiated above the solar surface in a region inside 2.5 solar radii from the Sun center. In observing the solar corona in this region using visible light, the contributions from the solar disk far outweigh, by orders of magnitude, the coronal loop observations of interest to study the initiation of these large eruptions. The advent of the solar coronagraph, where an occulting disk is placed over the solar disk to block the dominant source of on-disk light, is used in order to make the observations of the dimmer coronal loops. The major source of noise then in coronagraphs is now dominated by diffraction of light from the solar surface off the occulter. A "beach ball" coronagraph occultor with formation flying distance of 100+ feet can provide significant increase in the science capabilities possible.

Anticipated Benefits

Advance science capabilities in Solar and Astrophysics.

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

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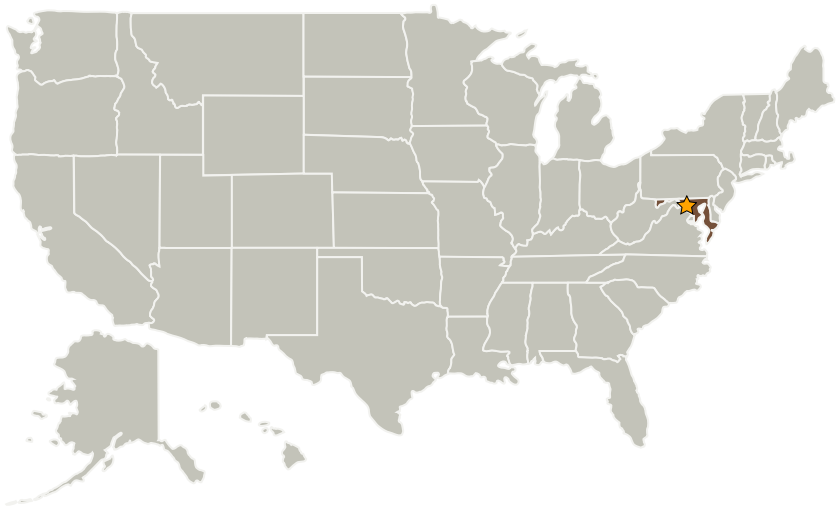
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Project Management

Program Manager:
Peter M Hughes

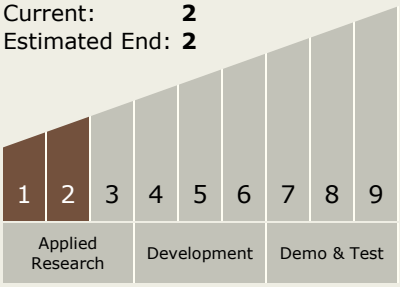
Project Manager:
Nikolaos Paschalidis

Principal Investigator:
Phillip C Chamberlin

Co-Investigator:
Adrian N Daw

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.2 Test and Qualification
    - TX13.2.3 Non-Destructive Inspection, Evaluation, and Root Cause Analysis